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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/709,615

05/18/2004

Ruvinda Gunawardana

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08/25/2006

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EXAMINER

PETTITT, JOHN F

ART UNIT

PAPER NUMBER

3744

DATE MAILED: 08/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/709,615	<b>Applicant(s)</b> GUNAWARDANA ET AL.	
	<b>Examiner</b> John Pettitt	<b>Art Unit</b> 3744	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 May 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 is/are pending in the application.  
     4a) Of the above claim(s) 6 and 14-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 8-13, 26-28 and 31-37 is/are rejected.
- 7) ☒ Claim(s) 2-5, 7, 29 and 30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. <u>20060725</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                         |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>May 02 &amp; 18, 2004</u> . | 6) <input type="checkbox"/> Other: _____.   |

## **DETAILED ACTION**

### ***Election/Restrictions***

Claims 6 and 14-25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in a telephone conversation on July 28<sup>th</sup>, 2006 with Victor Segura.

### ***Claim Objections***

Claims 1-13, and 26-37 are objected to because of the following informalities: the terms --chamber coupled-- are misspelled, "chambercoupled". See for example, claim 1 - line 8. However, there are multiple occurrences of this term that need to be corrected. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1, 2, 8-11, 26-28, and 31-37** are rejected under 35 U.S.C. 103(a) as being unpatentable over Inglis et al. (US 3,654,768) in view of DiFoggio (US 6,672,093 B2).

**In regard to claim 1**, Inglis et al. ('768) teach a vortex tube cooling system comprising a first high pressure chamber (92); a vortex tube (22) coupled to the first pressure chamber; a cooling chamber (11) coupled to the vortex tube; a second pressure chamber (54) coupled to the cooling chamber. The pressure chambers are adapted for cool fluid to flow from the vortex tube into the cooling chamber. While Inglis et al. ('768) teach most of the limitations of the claim, they do not explicitly teach a housing surrounding all of these components.

DiFoggio ('093) teach a housing (52) for the purpose of holding the electronics (8) of a sensory system (column 8, lines 1-10) as well as a cooling chamber (132) in a down-hole environment. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine the cooling system of Inglis et al. ('768) with the housing and cooling chamber of DiFoggio ('093) to provide a compact cooling system for the electronics (8) within the down-hole environment to provide sufficient and convenient cooling to the electronics.

**In regard to claim 2**, Inglis et al. ('768) teach that the first pressure chamber (92) is capable of pressurization. Also, as flow is able to escape from the second pressure chamber (54), the second pressure chamber (54) is deemed capable of evacuation, that is, capable of allowing flow to evacuate.

**In regard to claim 8-9**, the combination of Inglis et al. ('768) and DiFoggio ('093) would be capable of disposal within a borehole traversing a subsurface formation while drilling the borehole and via a wireline cable (DiFoggio ('093), column 4, lines 1-10).

**In regard to claim 10**, the system of Inglis et al. ('768) has a plurality of valves between the chambers (items 83 and 118, Figure 2).

**In regard to claim 11**, the cooling chamber (132) of DiFoggio ('093) is adapted to house an electronic component.

**In regard to claim 12**, DiFoggio ('093) teaches an insulated cooling chamber (item 132 and column 7, lines 25-35) for the purpose of reducing the heat transfer to the electronics (8). The phase change material (134) is an insulation material. In addition DiFoggio ('093) teaches the disposal of other insulation materials around the outside or the inside of the Dewar flask (column 8, lines 50-67).

**In regard to claim 13**, DiFoggio ('093) teaches the cooling chamber (132) is disposed within a Dewar flask (item 136 and column 7, lines 22-35) for protecting the electronics (8) from heat while the electronic devices are operated in a down-hole environment.

**In regard to claim 26**, the method of cooling a component within a housing as disclosed by the applicant is the obvious method of cooling a component with the combined system of Inglis et al. ('768) and DiFoggio ('093) as discussed for claim 1 above.

**In regard to claim 27-28**, the method of pressurizing the first pressure chamber and evacuating the second pressure chamber *as well as* pumping a fluid from the second pressure chamber into the first pressure chamber is met by the obvious and well-known method of making an open cooling system into a closed loop by connecting a compressor to the first and second pressure chambers such that the first pressure

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chamber is pressurized and the second pressure chamber is evacuated. The method of making such a closed system is desirable because it provides a greater level of control of the contaminants within the air used within the cooling system. Reducing the contaminants in the air stream is beneficial since contaminants in the air stream tend to foul the surfaces of the cooling system such that the desirable heat transfer between the item(s) to be cooled and the cooling air is retarded over time.

**In regard to claim 31**, the method of equipping a housing with a double walled cooling chamber is obvious in view of the housing (52) taught by DiFoggio ('093) which is equipped with the double-walled cooling container (132). Additionally, adapting the cooling chamber (132) of DiFoggio ('093) to allow fluid to flow from the vortex tube (22) of Inglis et al. ('768) through a space between the walls of the double-walled cooling container (132) would have been an obvious means of integrating the system of Inglis et al. ('768) with the housing (52) and cooling chamber (132) of DiFoggio ('093). The reason being that this permits the cooling air from the vortex tube (22) to cool the electronics (8) in the same fashion as the liquid water had cooled the electronics (8) in the cooling system of DiFoggio ('093). Such a method would be the most convenient and immediate means of equipping the housing (52) with a cooling chamber (132) such that the vortex tube (22) could cool the electronics (8).

**In regard to claim 32-33**, the method of disposing the housing with a borehole traversing a subsurface formation while drilling and via a wireline cable would have been obvious in view of the intended use of the system of DiFoggio ('093) (column 4, lines 15-40).

**In regard to claim 34**, the method of equipping a housing with a plurality of valves between the chambers to regulate flow through the chambers would have been obvious in view of the regulating valves (83 and 118) of Inglis et al. ('768) between the first (92), second (54), and cooling (DiFoggio - 132) chambers.

**In regard to claim 35**, the method of disposing an electronic component within the cooling chamber of the combined system of Inglis et al. ('768) and DiFoggio ('093) as discussed for claim 26 above would have been obvious in view of the electronics (8) of DiFoggio ('093), which are disposed in the cooling chamber (132).

**In regard to claim 36**, the method of equipping a housing with an insulated cooling chamber would have been obvious in view of the insulated cooling chamber (132 and column 7, lines 25-35) of DiFoggio ('093). The phase change material (134) is an insulation material and other insulation materials, described by DiFoggio ('093) as discussed above in claim 12, are useful for insulating the electronics (8).

**In regard to claim 37**, the method of disposing the cooling chamber within a Dewar flask would have been obvious in view of the cooling chamber (132) within the Dewar flask (136) of DiFoggio ('093).

#### ***Allowable Subject Matter***

**Claims 3-5, 7, and 29-30** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Pettitt whose telephone number is 571-272-0771. The examiner can normally be reached on M-F 8a-4p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JFP III  
August 7, 2006

  
CHERYL TYLER  
SUPERVISORY PATENT EXAMINER